

**Occupational Exposure to Benzene at the ExxonMobil Refinery at Baton Rouge, Louisiana (1977-2005)**

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Because crude oil contains up to 3% benzene and there is an association between high chronic exposure to appreciable concentrations of benzene and acute myelogenous leukemia, exposure of refinery workers has been studied for many years. To date, no extensive industrial hygiene exposure analyses for historical benzene exposure have been performed, and none have focused on the airborne concentrations in the workplace at specific refineries or for specific tasks. In this study, the authors evaluated the airborne concentrations of benzene and their variability over time at the ExxonMobil refinery in Baton Rouge between 1977 and 2005. Refinery workers were categorized into 117 worker groups using company job descriptions. These 117 groups were further collapsed into 25 job categories based on similarity of measured exposure results. Results of 5289 personal air samples are included in this analysis; 3403 were considered nontask ( $\geq 180$  min) personal samples, and 830 were considered task-related ( $< 180$  min) personal samples; the remainder did not fit in either category. In general, nontask personal air samples indicated that exposures of the past 30 years were generally below the occupational exposure limit of 1 ppm, but there was only a small, decreasing temporal trend in the concentrations. The job sampled most frequently during routine operations was process technician and, as broken down by area, resulted in the following mean benzene concentrations: analyzers (mean = 0.12 ppm), coker (mean = 0.013 ppm), hydrofiner (mean = 0.0054 ppm), lube blending and storage (mean = 0.010 ppm), waste treatment (mean = 0.092 ppm), and all other areas (mean = 0.055 ppm). Task-based samples indicated that the highest exposures resulted from the sampling tasks, specifically from those performed on process materials; in general, though, even these tasks had concentrations well below the STEL of 5 ppm. The most frequently sampled task was gauging (mean = 0.12 ppm). Task-related exposures were also similar across job categories for a given task, with a few exceptions. This study thus provides a task-focused analysis for occupational exposure to benzene during refinery operations, which can be insightful for understanding exposures at this refinery and perhaps others operated since about 1975.

Keywords: Benzene, Exposure assessment, Industrial hygiene, Refineries